Intracoastal Waterway (Subsegment 031101), Louisiana, Draft TMDL for Fecal Coliform

Prepared for:

Louisiana Department of Environmental Quality, Water Quality Assessment Division, Total Maximum Daily Load Program

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EXECUTIVE SUMMARY

Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's Water Quality Planning and Management Regulations (Title 40 of the *Code of Federal Regulations* Part 130) require states to identify waterbodies that are not meeting water quality standards and to develop total maximum daily loads (TMDLs) of pollutants for those waterbodies. A TMDL establishes the amount of a pollutant that a waterbody can assimilate without exceeding its water quality standard for that pollutant. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources in order to restore and maintain the quality of the state's water resources (USEPA 1991).

A TMDL for a given pollutant and waterbody is composed of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. The TMDL components are illustrated using the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS.$$

This fecal coliform TMDL has been developed for the Intracoastal Waterway, which is in Calcasieu River Basin in southwestern Louisiana. The Intracoastal Waterway flows for 19 miles from Calcasieu Lock to the East Calcasieu River Basin boundary.

The total allowable TMDL was calculated using the critical tidal flow and the state's fecal coliform criteria. The TMDL was then allocated to its WLA, MOS, and LA components (Table ES-1).

Table ES-1. Summary of fecal coliform bacteria TMDL for the Intracoastal Waterway

Season	TMDL (MPN/day)	WLA (MPN/day)	LA (MPN/day)	Explicit MOS (MPN/day)
Winter	3.00E+15	1.36E+14	2.27E+15	6.00E+14
Summer	6.00E+14	2.71E+13	4.53E+14	1.20E+14

Note: MPN = most probable number.

1. Introduction

Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's (EPA's) Water Quality Planning and Management Regulations (Title 40 of the *Code of Federal Regulations* [CFR] Part 130) require states to develop total maximum daily loads (TMDLs) of pollutants for waterbodies that are not supporting their designated uses, even if pollutant sources have implemented technology-based controls. A TMDL establishes the maximum allowable load (mass per unit of time) of a pollutant that a waterbody is able to assimilate and still support its designated uses. The maximum allowable load is determined on the basis of the relationship between pollutant sources and in-stream water quality. A TMDL provides the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources in order to restore and maintain the quality of the state's water resources (USEPA 1991).

A TMDL for a given pollutant and waterbody is composed of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. The TMDL components are illustrated using the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS.$$

This fecal coliform TMDL has been developed for the Intracoastal Waterway, which is in Calcasieu River Basin in southwestern Louisiana (Figure 1-1). The Intracoastal Waterway flows for 19 miles from Calcasieu Lock to the East Calcasieu River Basin boundary.

In 2000, the Intracoastal Waterway was identified as not supporting its designated use of fish and wildlife propagation on the state's section 303(d) list of impaired waterbodies because of salinity, total dissolved solids, chloride, and sulfates natural sources (LDEQ 2001). The state's 2002 and 2004 section 303(d) lists of impaired waterbodies have all designated uses being met on subsegment 031101. The state's 2006 and draft 2008 editions of the *Louisiana Water Quality Inventory: Integrated Report* (*Integrated Report*) show subsegment 031101 as not supporting its designated use of fish and wildlife propagation because of chloride, sulfates, and total dissolved solids from changes in tidal circulation/flushing and impacts from hydro-structure flow regulation/modification (LDEQ 2007a, 2008). The state's draft 2008 *Integrated Report* also shows subsegment 031101 as not supporting its designated use of primary contact recreation because of fecal coliform from natural sources, rangeland grazing, and sewage discharges in unsewered areas (LDEQ 2008). Fecal coliform data from 2005 and 2009 support the current use impairment listings for primary contact recreation and would support a listing for secondary contact recreation for the Intracoastal Waterway.

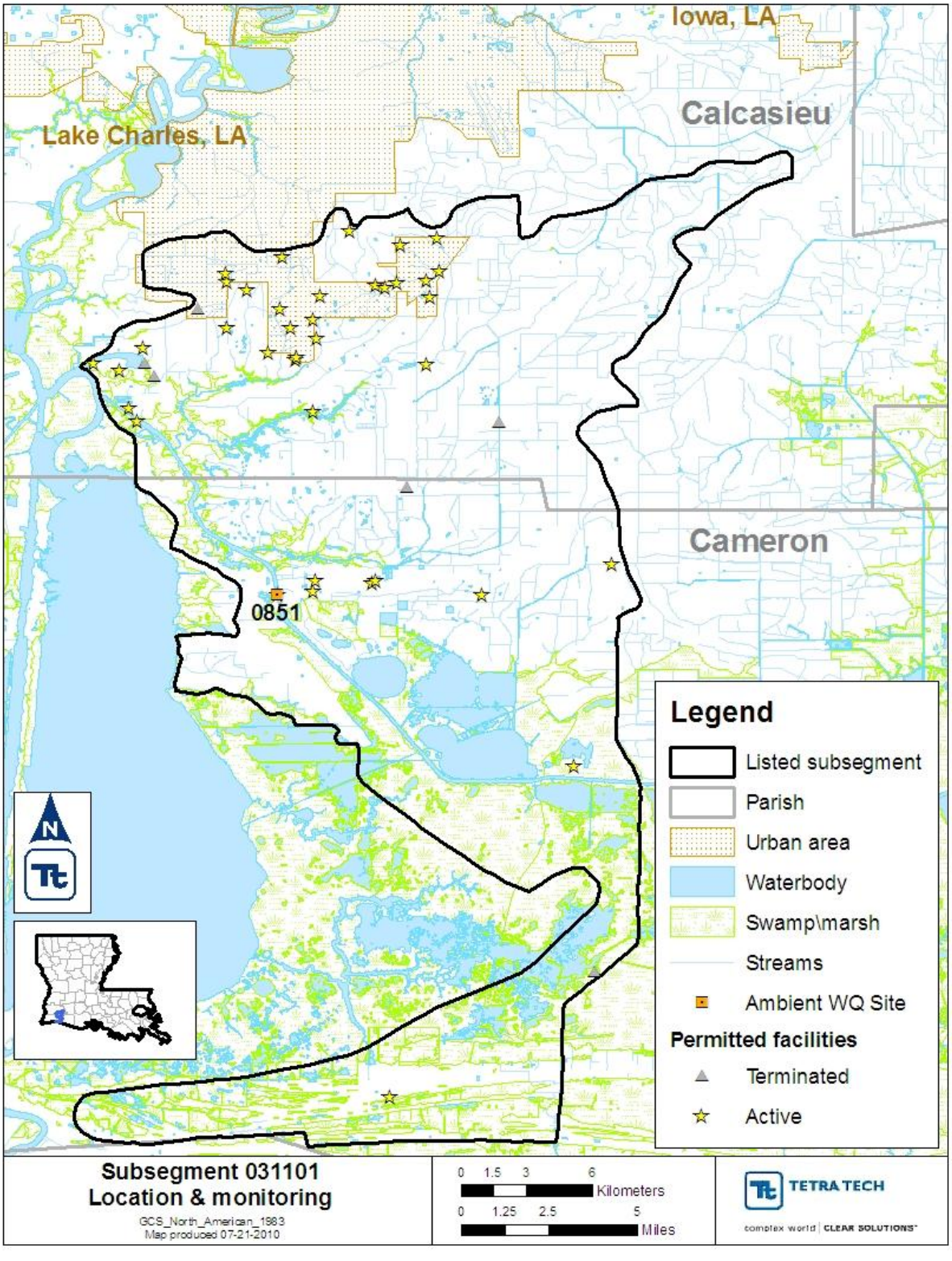

Figure 1-1. Intracoastal Waterway (subsegment 031101) location and monitoring.

2. Study Area Description

2.1 Calcasieu River Basin—The Intracoastal Waterway

This fecal coliform TMDL has been developed for the Intracoastal Waterway, which is in Calcasieu River Basin in southwestern Louisiana (Figure 1-1). The Intracoastal Waterway flows for 19 miles from Calcasieu Lock to the East Calcasieu River Basin boundary. The Calcasieu River Basin is in southwest Louisiana and is positioned in a north-south direction between the Mermentau River and Sabine River. The drainage area of the Calcasieu Basin covers approximately 3,910 square miles. The headwaters of the Calcasieu River are in the hills west of Alexandria. The Calcasieu River flows south for about 160 miles to the Gulf of Mexico. The mouth of the river is about 30 miles east of the Texas-Louisiana state line. The landscape in this basin varies from pine-forested hills in the upper end to brackish and salt marshes in the lower reaches around Calcasieu Lake; the basin also includes the city of Lake Charles (LDEQ 2003b).

The draft 2008 *Integrated Report* shows the primary contact recreation designated use not being supported and fecal coliform listed as the reason for the impairment of this subsegment. The sources of the fecal coliform bacteria are natural sources, rangeland grazing, and sewage discharges in unsewered areas (LDEQ 2008).

Land use data from the 2001 National Land Cover Database (NLCD) were used in Table 2-1 and Figure 2-1. NLCD 2001 is a land cover database composed of land cover, impervious surface, and canopy density data. NLCD 2001 uses improved classification algorithms, which result in data with more precise rendering of spatial boundaries between the 16 classes than those obtained using NLCD 1992 (USEPA 2007).

Table 2-1. Subsegment 031101 land use (NLCD 2001)

Land use	Percent
Open water	8.23%
Developed	8.94%
Barren land	0.05%
Forest	0.52%
Grass/shrub	1.41%
Pasture/hay	19.42%
Cultivated crops	26.46%
Woody wetlands	2.93%
Emergent herbaceous wetlands	32.04%

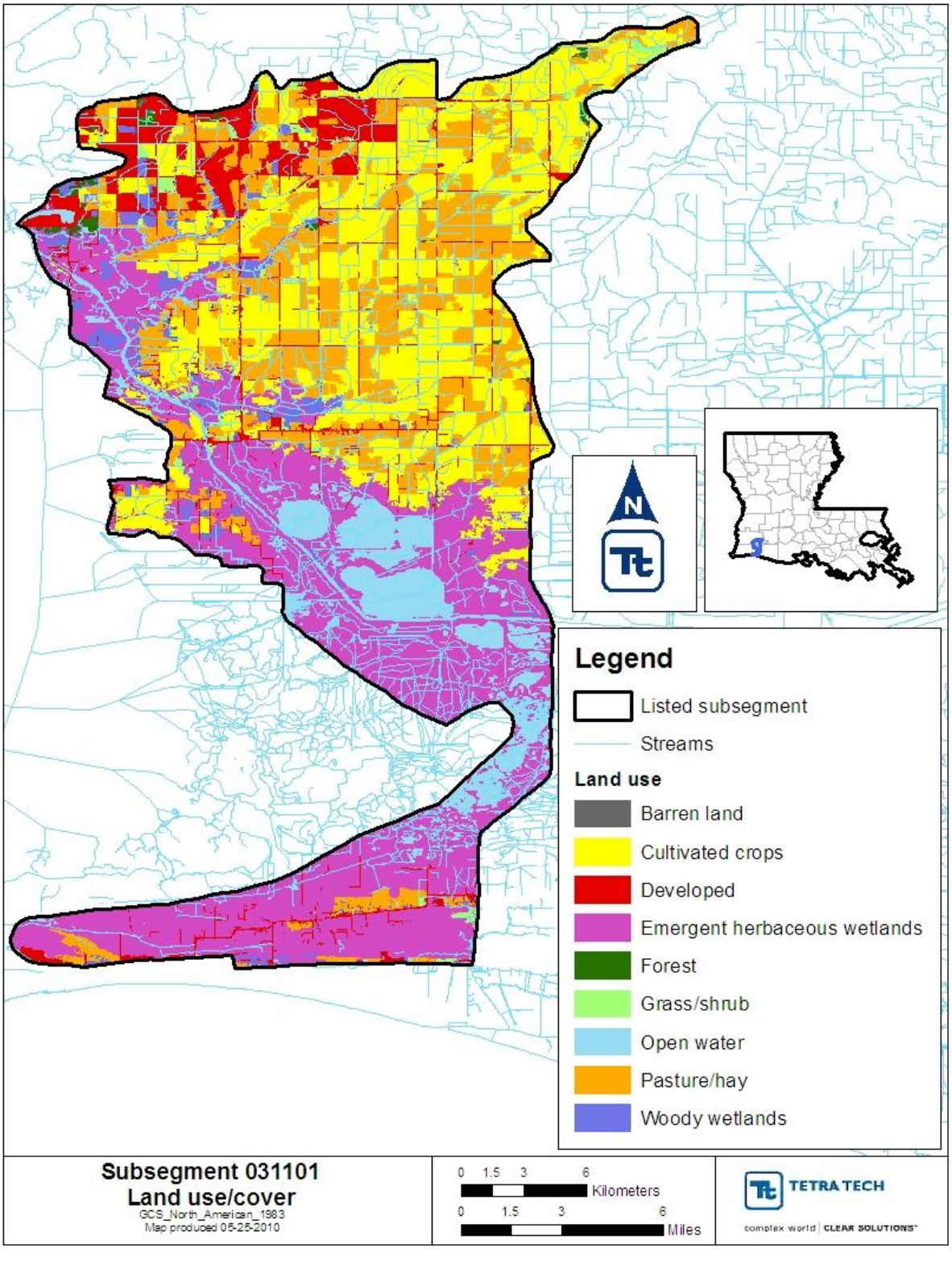

Figure 2-1. Land use in the Intracoastal Waterway (subsegment 031101).

2.2 Water Quality Data

There is one water quality station with fecal coliform data on the Intracoastal Waterway. Station 851 (Intracoastal Waterway west of Boones Corner, Louisiana) had 25 fecal coliform observations collected in 2005, 2008, and 2009. Two fecal coliform observations collected at station 851 exceeded the water quality criterion for primary contact recreation; the exceedances occurred in May and August. Two fecal coliform observations collected at station 851 exceeded the water quality criterion for secondary contact recreation; the exceedances occurred in January and February. Of the water quality samples collected after 2005, 8 percent exceeded the water quality criterion for primary contact recreation and secondary contact recreation on Intracoastal Waterway west of Boones Corner, Louisiana. Appendix A contains the raw water quality data.

The fecal coliform data were plotted over time for subsegment 031101 (Figure 2-2). No distinct seasonal trends or patterns can be seen in the water quality data.

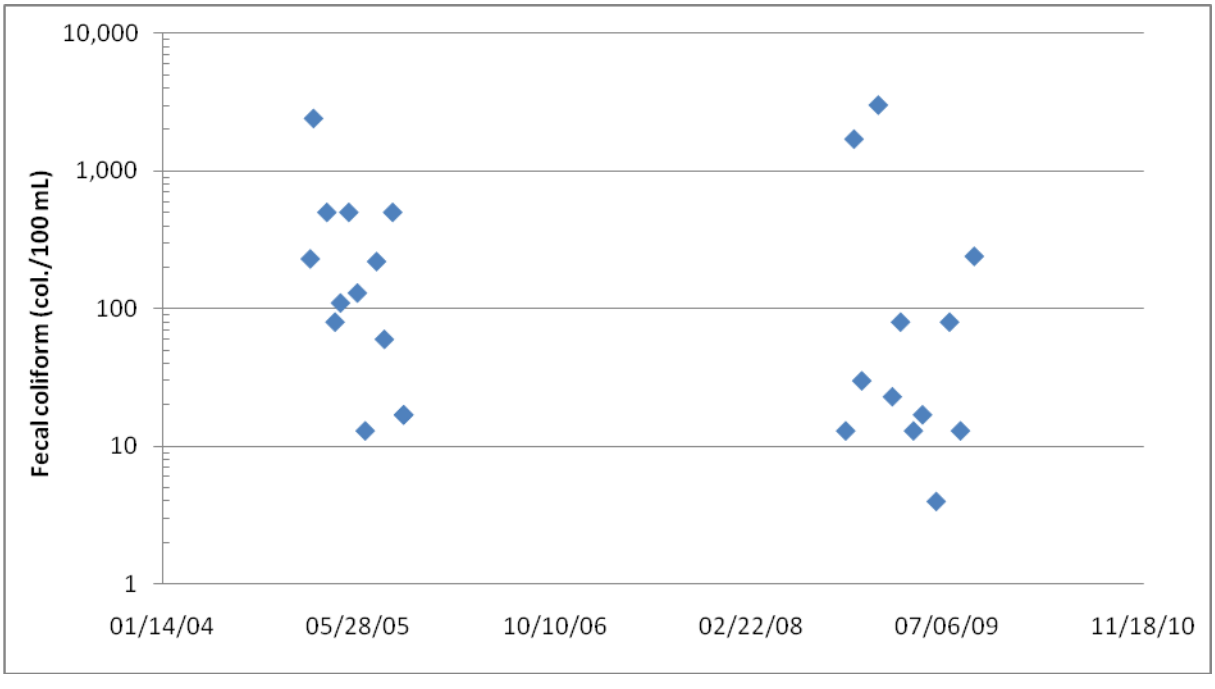

Figure 2-2. Fecal coliform data at station 851.

2.3 Water Quality Standards and Criteria

The designated uses for subsegment 031101 include primary contact recreation, secondary contact recreation, and propagation of fish and wildlife. Primary contact recreation includes any recreational or other water contact activity that involves prolonged or regular full-body contact with the water and in which the probability of ingesting appreciable amounts of water is considerable. Examples of that type of water use include swimming, water skiing, and diving (LDEQ 2007b). Secondary contact recreation includes any recreational or other water contact activity in which prolonged or regular full-body contact with the water is either incidental or accidental and the probability of ingesting appreciable amounts of water is minimal. Examples of that type of water use include fishing, wading, and boating (LDEQ 2007b). The criteria for protection of aquatic life are based on acute and chronic concentrations in fresh and marine waters and are developed primarily for attainment of the fish and wildlife propagation use.

Numeric criteria were used in conjunction with the assessment methodology presented in the Louisiana Department of Environmental Quality's (LDEQ) 305(b) report (LDEQ 2005) to list

impaired subsegments. The LDEQ assessment methodology specifies that for primary contact recreation no more than 25 percent of the total samples collected on a monthly or near-monthly basis may exceed a fecal coliform density of 400/100 milliliters (mL). The primary contact recreation criterion applies only during the defined recreational period of May 1 through October 31. During the non-recreational period of November 1 through April 30, the criterion for secondary contact recreation applies. For secondary contact recreation, no more than 25 percent of the total samples collected on a monthly or near-monthly basis may exceed a fecal coliform density of 2,000/100 mL. The secondary contact recreation criterion applies year-round (LDEQ 2007b).

The Louisiana water quality standards also include an antidegradation policy (*Louisiana Administrative Code* Title 33, Part IX, Section 1109.A), which states that state waters exhibiting high water quality should be maintained at that high level of water quality. If that is not possible, water quality of a level that supports the designated uses of the waterbody should be maintained. The designated uses of a waterbody may be changed to allow a lower level of water quality only through a use attainability study. LDEQ has developed this TMDL to be consistent with the state's antidegradation policy (LDEQ 2000).

2.4 Flow

There are no active U.S. Geological Survey (USGS) flow-monitoring gages or other known flow gages in subsegment 031101.

2.5 Identification of Sources

Louisiana's draft 2008 *Integrated Report* states that the suspected nonpoint sources of the fecal coliform bacteria impairment in the Intracoastal Waterway, subsegment 031101, are natural sources, rangeland grazing, and sewage discharges in unsewered areas (LDEQ 2008).

Overflows in sanitary sewer lines or major upsets at wastewater treatment plants can be related to poor maintenance in collection system interceptor lines (infiltration and inflow or line clogging), equipment failures at lift stations, or inadequate pretreatment programs (LDEQ 2005). Municipal point sources include pollution introduced from end-of-pipe discharges from publicly owned treatment works.

Information on point source dischargers in the subsegment was obtained from LDEQ files. According to the LDEQ discharger database, 42 active permitted facilities are discharging to the Intracoastal Waterway. Six terminated permits were also location in the subsegment (Figure 2-3 and Table 2-2).

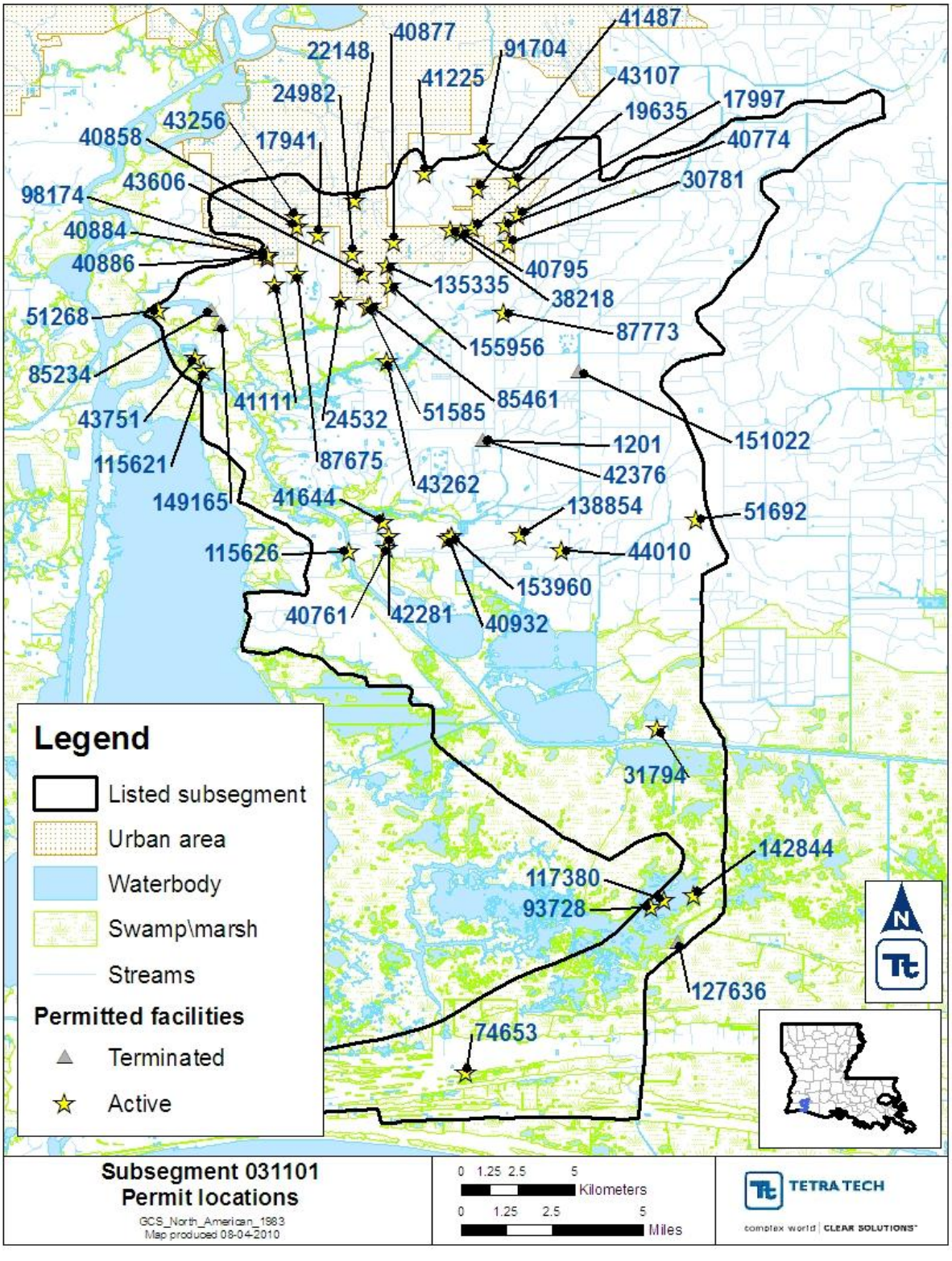

Figure 2-3. Locations of permitted dischargers on subsegment 031101.

Table 2-2. Summary of NPDES permits in subsegment 031101

AI #	Permit #	Outfall	Facility name	Exp. date	Facility type	Outfall type	Receiving waterbody
22148	LA0081981	001	Total Environmental Solutions Inc (TESI) - Highland Meadow Trails Subdivision (Lake Street)	05/31/15	Electric, Gas, and Sanitary Services	treated sanitary wastewater	Coulee Hippolite to Intracoastal Waterway
40795	LA0119822	001	Quail Ridge Limited Partnership - Quail Ridge Mobile Home Park	02/28/12	General Agency Interest	treated sanitary wastewater	Unnamed ditch to Black Bayou to Intracoastal Waterway
85461	LAG110103	001	Dunham Price Inc - S Lake Charles Facility	03/15/14	Stone, Clay, Glass, and Concrete Products	wastewaters and stormwater	local drainage to Coulee Hippolyte to Intracoastal Waterway
		004				stormwater	local drainage to Coulee Hippolyte to Intracoastal Waterway
		005				treated sanitary wastewater	local drainage to Coulee Hippolyte to Intracoastal Waterway
51585	LAG110200	001	Angelle Concrete Group LLC - Lincoln Road Plant	03/14/14	Stone, Clay, Glass, and Concrete Products	wastewaters and stormwater	ditch - Coulee Hippolyte
31794	LAG33A429	001	Sweet Lake Field Facility	11/30/10	Oil and Gas Extraction	reserve pit dewatering effluent	Sweet Lake
		002				deck drainage	Sweet Lake
		003				formation test fluids	Sweet Lake
		005				domestic wastewater	Sweet Lake
		006				hydrostatic test water	Sweet Lake
		007				blowdown, excess cement, filter media, etc.	Sweet Lake
		04A				treated sanitary wastewater (non-oyster)	Sweet Lake
155956	LAG33A806	002	Walker #1 Production Facility - South Lake Charles Field	11/30/10	Oil and Gas Extraction	deck drainage	ditch to the Intracoastal Waterway
17997	LAG530146	001	Country Living Trailer Park	11/30/12	Electric, Gas, and Sanitary Services	treated sanitary wastewater	Ditch to Black Bayou
41644	LAG530228	001	Grand Lake Trailer Park	11/30/12	General Agency Interest	treated sanitary wastewater	unnamed ditch to South Fork Black Bayou to Intracoastal Waterway
43107	LAG530474	001	Rutherford Trailer Park	11/30/12	General Agency Interest	treated sanitary wastewater	ditch to Black Bayou
24532	LAG530537	001	Marine Spill Response Corp	11/30/12	Services, not elsewhere classified	treated sanitary wastewater	local drainage to Hippolyte Coulee
43751	LAG530634	001	US Army COE Calcasieu Lock	11/30/12	General Agency Interest	treated sanitary wastewater	marsh to Intracoastal Waterway
		002				treated sanitary wastewater	Intracoastal Waterway
		003				treated sanitary wastewater	Intracoastal Waterway
40761	LAG530701	001	BellSouth Telecommunications K3520	11/30/12	Communications	treated sanitary wastewater	local drainage to Intracoastal Canal
51268	LAG531380	001	Talens Marine & Fuel LLC - Lake Charles Dock	11/30/12	Wholesale Trade-Non-durable Goods	treated sanitary wastewater	Intracoastal Waterway
115621	LAG531478	001	LADOTD - Black Bayou Pontoon Bridge - Sewage Treatment	11/30/12	Transportation Services	treated sanitary wastewater	Intracoastal Canal
115626	LAG531843	001	LADOTD - Grand Lake	11/30/12	Transportation	treated sanitary	Intracoastal Canal

AI #	Permit #	Outfall	Facility name	Exp. date	Facility type	Outfall type	Receiving waterbody
			Pontoon Bridge - Sewage Treatment		Services	wastewater	
135335	LAG532005	001	ERA Helicopters LLC - ERA Accounting Annex	11/30/12	Transportation by Air	treated sanitary wastewater	Local drainage to Hippolyte Coulee to Black Bayou to the Intracoastal Waterway
153960	LAG532446	001	Grand Lake Elementary School	11/30/12	Educational Services	treated sanitary wastewater	Unnamed marsh to South Fork Black Bayou to Intracoastal Waterway
51692	LAG532686	001	Cameron Parish Police Jury - Sweet Lake Solid Waste Collection Site	11/30/12	Parish Agency	treated sanitary wastewater	Parish drainage ditch to unnamed bayou to Intracoastal Waterway
41225	LAG540053	001	Trahan Rental Properties LLC - Oak Pine Trailer Park	07/01/13	General Agency Interest	treated sanitary wastewater	Unnamed creek to Coulee Hippolyte to Black Bayou to Intracoastal Waterway
38218	LAG540076	001	Christian World Ministries of Lake Charles Louisiana Inc	07/01/13	Membership Organizations	treated sanitary wastewater	ditch to Hippolyte Coulee to Black Bayou
40774	LAG540179	001	Phoenix Mobile Home Park of Lake Charles LLC	07/01/13	General Agency Interest	treated sanitary wastewater	ditch to Black Bayou
40877	LAG540199	001	McNeese State University Burton Coliseum	06/30/13	General Agency Interest	treated sanitary wastewater	ditch to Hippolyte Coulee to Black Bayou
40932	LAG540217	001	Grand Lake High School	06/30/13	Educational Services	treated sanitary wastewater	Ditch to South Fork Black Bayou to Intracoastal Waterway
41111	LAG540240	001	Clearview Mobile Home Park	6/30/13	General Agency Interest	sanitary wastewater	unnamed ditch to unnamed canal to Coulee Hippolyte to Black Bayou to Intracoastal Waterway
44010	LAG540802	001	Z Best Inc	07/01/13	General Agency Interest	treated sanitary wastewater	Intracoastal Canal
		002				treated sanitary wastewater	Intracoastal Canal
40858	LAG540841	001	South Calcasieu Owners Association - South Calcasieu Estates I & II	07/01/13	General Agency Interest	treated sanitary wastewater	local drainage to Coulee Hippolyte to Black Bayou to Intracoastal Waterway
87675	LAG541015	001	Southland Trailer Park	07/01/13	Hotels, Camps, and Other Lodging Places	treated sanitary wastewater	Hippolyte Coulee
		002				treated sanitary wastewater	Hippolyte Coulee
138854	LAG541424	001	Shandy Acres LLC - Shandy Acres	6/30/13	General Agency Interest	sanitary wastewater	unnamed drainage ditch to South Fork Black Bayou to Intracoastal Waterway
17941	LAG560066	001	Oak Meadow Water Works Inc - Oak Meadow Subdivision	06/01/14	General Agency Interest	treated sanitary wastewater	local drainage to Coulee Hippolyte to Intracoastal Waterway
43256	LAG560162	001	Smith Mobile Home Village Inc	06/01/14	General Agency Interest	treated sanitary wastewater	local drainage to Intracoastal Waterway
19635	LAG570044	001	RLP Operations LLC - Fairview Mobile Estates South	04/30/14	Electric, Gas, and Sanitary Services	treated sanitary wastewater	ditch to Hippolyte Coulee to Black Bayou to Intracoastal Canal
43262	LAG570152	001	Dation LLC - Gulf Stream Manor	05/01/14	Hotels, Camps, and Other Lodging Places	treated sanitary wastewater	ditch to Black Bayou
41487	LAG570187	001	RLP Operations LLC - Fairview Mobile Estates North	04/30/14	Electric, Gas, and Sanitary Services	treated sanitary wastewater	local drainage to Coulee Hippolyte to Black Bayou to Intracoastal Waterway
91704	LAG570207	001	Lake Charles City of - Sugarloaf Community	4/30/14	General Agency Interest	treated sanitary wastewater	parish drainage ditch to Hippolyte Coulee to Black

AI #	Permit #	Outfall	Facility name	Exp. date	Facility type	Outfall type	Receiving waterbody
							Bayou to Intracoastal Waterway
42281	LAG750134	001	Leboeuf's Carwash	03/15/14	Automotive Repair, Services, and Parking	wash wastewater	Intracoastal Waterway
24982	LAG750294	001	PHI Inc	03/15/14	Transportation by Air	wash water	local drainage - Hippolyte Coulee - Black Bayou
30781	LAG780011	001	Tommasi Disposal Inc	10/01/12	Heavy Construction Other Than Bldg. Constr.	landfill wastewaters	unnamed ditch to Black Bayou
87773	LAG940022	001A	Jordan Oil Company	10/15/14	Oil and Gas Extraction	wastewaters	Black Bayou
		001B				wastewaters	Black Bayou
		001C				wastewaters	Black Bayou
43606	LAR05M770		Vision Aviation - Aircraft Refueling Facility	05/01/11	Transportation by Air	MSGP - stormwater	Black Bayou - Calcasieu Ship Canal
74653	LAR05N320		LADOTD - Creole Maintenance Unit	05/27/10	State Agency	MSGP - stormwater	Sabine River
108479			Lake Charles				
108485	LAR041019		Calcasieu Parish Police Jury	12/05/12	MS4	MS4	Calcasieu River, Calcasieu River Ship Channel, Lake Charles, Prien Lake, Contraband Bayou, Bayou Verdine, West Fork Calcasieu River, Bayou d'Inde, English Bayou
127636	LAG33A063	001	High Island Prospect	Terminated 09/07	Oil and Gas Extraction		
42376	LAG490013	001	William Vigo Property	Terminated 02/07/05	General Agency Interest		
151022	LAR10E321	001	Calcasieu Parish Police Jury - Friesen Rd Work	Terminated 12/16/08	Nonclassifiable Establishments		
149165	LAG780028	001	Tommasi Disposal Inc - Joe LeDoux Road Landfill	Terminated 04/08/09	Electric, Gas, and Sanitary Services		
85234	LAR10B400		Lake Charles Gas Processing Plant	Terminated 01/11/02	Oil and Gas Extraction		
40884	LAG560039	001	Country Pines Utilities - Country Pines Subdivision Plant #2	Terminated 04/24/06	General Agency Interest		

Phase I stormwater systems are a possible point source contributor in the Calcasieu River Basin. Stormwater discharges are generated by runoff from urban land and impervious areas such as paved streets, parking lots, and rooftops during precipitation events. These discharges often contain high concentrations of pollutants that can eventually enter nearby waterbodies. Most stormwater discharges are considered point sources and require coverage by a Louisiana Pollutant Discharge Elimination System (LPDES) permit.

Under the LPDES stormwater program, operators of large, medium, and regulated small municipal separate storm sewer systems (MS4s) must obtain authorization to discharge pollutants. The Stormwater Phase I Rule (55 *Federal Register* 47990, November 16, 1990) requires all operators of medium and large MS4s to obtain an LPDES permit and develop a stormwater management program. Medium and large MS4s are defined by the size of the population within the MS4 area, not including the population served by combined sewer systems. A medium MS4 has a population between 100,000 and 249,999. A large MS4 has a population of 250,000 or more.

Calcasieu Parish and the city of Lake Charles are regulated as a MS4 as permit number LAR041019 (AI# 108479 and 108485). The permit covers Lake Charles and the Lake Charles Urban Area,

including Westlake, Sulphur, and Calcasieu Parish. The MS4 discharges to Calcasieu River, Calcasieu River Ship Channel, Lake Charles, Prien Lake, Contraband Bayou, Bayou Verdine, West Fork Calcasieu River, Bayou d'Inde, and English Bayou. The urban area associated with the MS4, within the subsegment, is 12.89 square miles.

3. TMDL Load Calculations

A TMDL is the total amount of a pollutant that can be assimilated by the receiving waterbody while still achieving water quality standards. In TMDL development, allowable loadings from all pollutant sources that cumulatively amount to no more than the TMDL must be established and thereby provide the basis for establishing water quality-based controls.

A TMDL for a given pollutant and waterbody is composed of the sum of individual WLAs for point sources and LAs for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit MOS to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. The TMDL components are illustrated using the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS.$$

TMDLs are typically expressed as a mass loading (e.g., pounds per day).

Both section 303(d) of the Clean Water Act and the regulations at 40 CFR 130.7 require that TMDLs include an MOS to account for uncertainty in the available data or in the actual effect that controls will have on the loading reductions and receiving water quality. The MOS may be expressed explicitly as unallocated assimilative capacity or implicitly using conservative assumptions in establishing the TMDL. For a more detailed discussion of the MOS, see Section 3.4.

3.1 Load Determination

The sampling events used as the basis for this TMDL were performed to meet the needs of the state to develop the biennial section 305(b) report (Water Quality Inventory) and the section 303(d) list of impaired waters. The data are adequate for a conservative TMDL using the assumption that no fate and transport mechanisms are present in the waterbodies. Data gathering did not include any flow measurements or any upstream sampling and measurements for background conditions. Without such data, it is not possible to conduct fate and transport modeling or calculate the reductions required from current loads.

Calculating the TMDL

Only observed data from during 2005 and after were used in this TMDL. The equation for the TMDL calculation is:

$$TMDL\ (MPN/day) = critical\ flow\ (gpd) \times fecal\ coliform\ criterion\ (MPN/100\ mL)$$

$$\times\ 3{,}785.412\ mL/gallon.$$

Detailed flow information for subsegment 031101 was not available. To determine flow, the critical tidal flow was determined. To do this, the tidal cycle was assumed to be 24 hours and the tidal range was conservatively assumed to be1 foot. The critical tidal flow is calculated from the tidal flow, which is the average or typical flow averaged over one tidal cycle. The tidal flow is determined by multiplying the surface area of the waterbody by the typical tidal range (the distance between high and low flow) and divided by half a tidal cycle. The tidal flow is then divided by three to obtain the critical tidal flow. For the Intracoastal Waterway the surface area was assumed to be 45.3 million square feet, which was added to the surface area of Willow Lake (34.2 million square feet). Using the sum of these areas, the tidal flow was 1,840 cfs and the critical tidal flow was 613.5 cfs.

Fecal coliform summer criterion = 400 MPN/100 mL

Fecal coliform winter criterion = 2,000 MPN/100 mL

Critical tidal flow = 613.5 cfs = 396,538,977 gallons/day

Summer TMDL = (400 MPN/100 mL) × (396,538,977 gallons/day) × 3,785.412 mL/gallon = 6.00E+14 MPN/day

Winter TMDL = (2,000 MPN/100 mL) × (396,538,977 gallons/day) × 3,785.412 mL/gallon = 3.00E+15 MPN/day

3.2 TMDL

Table 3-1 presents the TMDL and allocations for subsegment 031101. Only observed data from 2005 and after were used in this TMDL. WLAs are discussed in Section 3.3; LAs, in Section 3.4; and MOSs, in Section 3.5.

Table 3-1. Summary of fecal coliform bacteria TMDL for the Intracoastal Waterway

Season	TMDL (MPN/day)	WLA (MPN/day)	LA (MPN/day)	Explicit MOS (MPN/day)
Winter	3.00E+15	1.36E+14	2.27E+15	6.00E+14
Summer	6.00E+14	2.71E+13	4.53E+14	1.20E+14

Note: MPN = most probable number.

3.3 Wasteload Allocation (WLA)

The WLA portion of the TMDL equation is the total loading of a pollutant that is assigned to point sources. The point sources in subsegment 031101 include sanitary wastewater and stormwater. Stormwater loading is usually based on average annual rainfall, while the TMDL is calculated at critical low (7Q10) flow. These two conditions are not compatible, therefore, when developing a TMDL at critical low flow LDEQ assumes that stormwater runoff is zero. Table 3-2 lists the individual fecal coliform WLAs for the point source facilities identified in Section 2.5.

WLAs for fecal coliform bacteria were calculated using monthly average permit limits, when applicable. If a permit does not have a monthly average permit limit, the weekly average permit limit was used. The preferred facility flow was the facility design or expected flow. If neither was available, the average (expected or observed) flows were used to calculate the WLAs. The permit maximum flow was used if the permitted or average flow was not available. The permit maximum flow was usually the maximum flow covered by the specific type of general permit. For example, the Louisiana Pollution Discharge Elimination System Class II Sanitary General Permit covers facilities with flow up to 25,000 gallons per day. The permit maximum flow sometimes was significantly greater than the expected flow, and therefore the permit maximum was used only when other flows were not available.

The equation for WLA calculation is:

Flow (gallon/day) × concentration (MPN/100 mL) × 3,785.412 mL/gallon = load (MPN/day).

Table 3-2. WLA summary for subsegment 031101

AI #	Permit #	Outfall	Facility name	Outfall type	Flow type	Flow (GPD)	FCB limit type	Limit (MPN/100 mL)	Load (MPN/d)
22148	LA0081981	001	Total Environmental Solutions Inc (TESI) - Highland Meadow Trails Subdivision (Lake Street)	treated sanitary wastewater	expected	85,000	monthly ave.	200	6.44E+08
40795	LA0119822	001	Quail Ridge Limited Partnership - Quail Ridge Mobile Home Park	treated sanitary wastewater	expected	95,000	monthly ave.	200	7.19E+08
		001		wastewaters and stormwater	30-day max	1,620	none		0.00E+00
		004		stormwater	30-day max	864	none		0.00E+00
85461	LAG110103	005	Dunham Price Inc - S Lake Charles Facility	treated sanitary wastewater	30-day max	480	weekly ave.	400	7.27E+06
51585	LAG110200	001	Angelle Concrete Group LLC - Lincoln Road Plant	wastewaters and stormwater	expected	0	none		0.00E+00
		001		reserve pit dewatering effluent	not avail.		none		0.00E+00
		002		deck drainage	DMR average	176	none		0.00E+00
		003		formation test fluids	not avail.		none		0.00E+00
		005		domestic wastewater	DMR average	544	none		0.00E+00
		006		hydrostatic test water	not avail.		none		0.00E+00
		007		blowdown, excess cement, filter media, etc.	not avail.		none		0.00E+00
31794	LAG33A429	04A	Sweet Lake Field Facility	treated sanitary wastewater (non-oyster)	DMR average	1,110	weekly ave.	200	8.40E+06
155956	LAG33A806	002	Walker #1 Production Facility - South Lake Charles Field	deck drainage	DMR average	62	none		0.00E+00
17997	LAG530146	001	Country Living Trailer Park	treated sanitary wastewater	actual	3,900	monthly ave.	200	2.95E+07
41644	LAG530228	001	Grand Lake Trailer Park	treated sanitary wastewater	expected	4,800	monthly ave.	200	3.63E+07
43107	LAG530474	001	Rutherford Trailer Park	treated sanitary wastewater	expected	7,500	monthly ave.	200	5.68E+07
24532	LAG530537	001	Marine Spill Response Corp	treated sanitary wastewater	actual	1,000	weekly ave.	400	1.51E+07
		001		treated sanitary wastewater	expected	1,200	weekly ave.	400	1.82E+07
		002		treated sanitary wastewater	expected	500	weekly ave.	400	7.57E+06
43751	LAG530634	003	USArmy COE Calcasieu Lock	treated sanitary wastewater	expected	500	weekly ave.	400	7.57E+06
40761	LAG530701	001	BellSouth Telecommunications K3520	treated sanitary wastewater	expected	500	weekly ave.	400	7.57E+06
51268	LAG531380	001	Talens Marine & Fuel LLC - Lake Charles Dock	treated sanitary wastewater	actual	20	weekly ave.	400	3.03E+05
115621	LAG531478	001	LADOTD - Black Bayou Pontoon Bridge - Sewage Treatment	treated sanitary wastewater	design	300	weekly ave.	400	4.54E+06
115626	LAG531843	001	LADOTD - Grand Lake Pontoon Bridge - Sewage Treatment	treated sanitary wastewater	expected	20	weekly ave.	400	3.03E+05
135335	LAG532005	001	ERA Helicopters LLC - ERA Accounting Annex	treated sanitary wastewater	expected	300	monthly ave.	200	2.27E+06
153960	LAG532446	001	Grand Lake Elementary School	treated sanitary wastewater	expected	4,500	monthly ave.	200	3.41E+07
51692	LAG532686	001	Cameron Parish Police Jury - Sweet Lake Solid Waste Collection Site	treated sanitary wastewater	expected	40	weekly ave.	400	6.06E+05
41225	LAG540053	001	Trahan Rental Properties LLC - Oak Pine Trailer Park	treated sanitary wastewater	expected	15,300	monthly ave.	200	1.16E+08
38218	LAG540076	001	Christian World Ministries of Lake Charles Louisiana Inc	treated sanitary wastewater	expected	14,500	monthly ave.	200	1.10E+08

AI #	Permit #	Outfall	Facility name	Outfall type	Flow type	Flow (GPD)	FCB limit type	Limit (MPN/100 mL)	Load (MPN/d)
40774	LAG540179	001	Phoenix Mobile Home Park of Lake Charles LLC	treated sanitary wastewater	permit max	24,999	monthly ave.	200	1.89E+08
40877	LAG540199	001	McNeese State University Burton Coliseum	treated sanitary wastewater	expected	13,000	monthly ave.	200	9.84E+07
40932	LAG540217	001	Grand Lake High School	treated sanitary wastewater	30-day max	31,886	monthly ave.	200	2.41E+08
41111	LAG540240	001	Clearview Mobile Home Park	sanitary wastewater	expected	7,800	monthly ave.	200	5.91E+07
44010	LAG540802	001	Z Best Inc	treated sanitary wastewater	expected	9,900	monthly ave.	200	7.50E+07
		002		treated sanitary wastewater	expected	9,900	monthly ave.	200	7.50E+07
40858	LAG540841	001	South Calcasieu Owners Association - South Calcasieu Estates I & II	treated sanitary wastewater	DMR average	3,118	monthly ave.	200	2.36E+07
87675	LAG541015	001	Southland Trailer Park	treated sanitary wastewater	design	4,650	monthly ave.	200	3.52E+07
		002		treated sanitary wastewater	design	4,650	monthly ave.	200	3.52E+07
138854	LAG541424	001	Shandy Acres LLC - Shandy Acres	sanitary wastewater	expected	18,000	monthly ave.	200	1.36E+08
17941	LAG560066	001	Oak Meadow Water Works Inc - Oak Meadow Subdivision	treated sanitary wastewater	expected	42,800	monthly ave.	200	3.24E+08
43256	LAG560162	001	Smith Mobile Home Village Inc	treated sanitary wastewater	expected	39,000	monthly ave.	200	2.95E+08
19635	LAG570044	001	RLP Operations LLC - Fairview Mobile Estates South	treated sanitary wastewater	expected	51,600	monthly ave.	200	3.91E+08
43262	LAG570152	001	Dation LLC - Gulf Stream Manor	treated sanitary wastewater	expected	100,000	monthly ave.	200	7.57E+08
41487	LAG570187	001	RLP Operations LLC - Fairview Mobile Estates North	treated sanitary wastewater	expected	64,500	monthly ave.	200	4.88E+08
91704	LAG570207	001	Lake Charles City of - Sugarloaf Community	treated sanitary wastewater	design	78,000	monthly ave.	200	5.91E+08
42281	LAG750134	001	Leboeuf's Carwash	wash wastewater	DMR average	1,350	none		0.00E+00
24982	LAG750294	001	PHI Inc	washwater	not avail.		none		0.00E+00
30781	LAG780011	001	Tommasi Disposal Inc	Landfill wastewaters	permit max	4,999	none		0.00E+00
87773	LAG940022	001A	Jordan Oil Company	wastewaters	DMR average	371	none		0.00E+00
		001B		wastewaters	DMR average	440	none		0.00E+00
		001C		wastewaters	DMR average	185	none		0.00E+00
43606	LAR05M770		Vision Aviation - Aircraft Refueling Facility	MSGP - stormwater	not avail.		none		0.00E+00
74653	LAR05N320		LADOTD - Creole Maintenance Unit	MSGP - stormwater	not avail.		none		0.00E+00
108479			Lake Charles						See
108485	LAR041019		Calcasieu Parish Police Jury	MS4	not avail.		none		Table 3-3

Note: MPN = most probable number.
This TMDL is being developed for critical low-flow conditions (7Q10). Under low-flow conditions, the WLA for all stormwater discharges will be 0.0 lb/d because the flow will be 0.0 MGD. However, existing stormwater permits limits continue to apply to all stormwater discharges.

LPDES permitted discharges without fecal coliform effluent limitations have been determined to not be sources of fecal coliform. For these dischargers, LDEQ is not providing allocations or permit limits. If at some point in the future, LDEQ determines that any of the discharges may contain fecal coliform, wasteload allocations may be provided along with the appropriate permit conditions.

EPA's stormwater permitting regulations require municipalities to obtain permit coverage for all stormwater discharges from MS4s. For the MS4 in the basin, a gross MS4 load was computed by multiplying the ratio of the MS4 urban area in the subsegment to the subsegment area and the TMDL minus the MOS and the WLAs from Table 3-2. The computed MS4 load (Table 3-3) was included as a WLA component of the TMDL because although MS4s are permitted dischargers, they function

similarly to nonpoint sources through storm-driven processes. Note that these values in Table 3-3 are estimates that can be refined in the future as more information about the MS4s and land use-specific loadings information becomes available. These loadings are not intended to be used to establish permit limits. Note also that the MS4 loads presented reflect only that portion of the MS4 in the subsegment because part of the MS4 area extends outside the subsegment.

Table 3-3. Fecal coliform bacteria WLAs for the MS4

AI #	LPDES number	Urban area	MS4 urban area (square miles)	Season	Load (MPN/d)
108479/108485	LAR041019	Lake Charles/ Calcasieu Parish Police Jury	12.89	Winter	1.36E+14
				Summer	2.71E+13

Notes: MPN = most probable number.

3.4 Load Allocation (LA)

The LA is the portion of the TMDL assigned to natural background loadings, as well as nonpoint sources such as septic tank leakage, wildlife, and agricultural practices. The LA was calculated for this TMDL by subtracting the WLA (including the MS4 loading) and MOS from the total TMDL. The final LA was calculated after the MS4 was determined. LAs were not allocated to separate nonpoint sources because of a lack of available source characterization data. The LA is shown in Table 3-1. LDEQ recognizes that stormwater may contribute to the fecal coliform impairments for Subsegment 031101, however, LDEQ cannot provide an allocation for stormwater with a TMDL developed for critical, low-flow conditions.

3.5 Margin of Safety (MOS)

The Clean Water Act requires that TMDLs take into consideration a margin of safety. The MOS is the portion of the pollutant loading reserved to account for any uncertainty in the data. There are two ways to incorporate the MOS. One way is to implicitly incorporate it by using conservative model assumptions to develop allocations. The other way is to explicitly specify a portion of the TMDL as the MOS and use the remainder for allocations (USEPA 1991). For this TMDL, an explicit MOS of 20 percent was used; it is shown in Table 3-1.

3.6 Seasonal Variability and Critical Condition

The federal regulations at 40 CFR 130.7 require that TMDLs include seasonal variations and take into account critical conditions for streamflow, loading, and water quality parameters. For this TMDL, fecal coliform bacteria loadings for subsegments with primary contact recreation and secondary contact recreation as the designated uses were determined for winter and summer on the basis of seasonal water quality criteria, thereby accounting for seasonality. In addition, the sampling results for all pollutants were plotted over time and reviewed for any seasonal patterns (see Section 2.2). The TMDL was developed over a several-year period, thereby accounting for seasonal variations.

The water quality criteria for fecal coliform bacteria include values that must not be exceeded more than 25 percent of the time (primary and secondary contact recreation) on the basis of sampling data obtained throughout the year, including during critical and noncritical conditions.

4. Monitoring Plan

LDEQ uses funds provided under section 106 of the Clean Water Act and under the authority of the Louisiana Environmental Quality Act to run a program for monitoring the quality of the state's surface waters. The LDEQ Surveillance Section collects surface water samples at various locations

using appropriate sampling methods and procedures to ensure the quality of the data collected. The objectives of the surface water monitoring program are to determine the quality of the state's surface waters, develop a long-term database for water quality trend analysis, and monitor the effectiveness of pollution controls. The data obtained through the surface water monitoring program are used to develop the state's biennial section 305(b) report (*Water Quality Inventory*) and the section 303(d) list of impaired waters. This information is also used to establish priorities for LDEQ's nonpoint source program.

LDEQ has implemented a watershed approach to surface water quality monitoring. Through this approach, the entire state is sampled on a 4-year cycle. Long-term-trend monitoring sites at various locations on the larger rivers and Lake Pontchartrain are sampled throughout the 4-year cycle. Sampling is conducted monthly to yield approximately 12 samples per site during each year the site is monitored. Sampling sites are located where they are considered representative of the waterbody. Within each basin, all monitored subsegments will be sampled over the year or years specified under each cycle period. The Intracoastal Waterway was monitored with the Calcasieu River Basin in 2004, 2005, 2008, and 2009. Fecal coliform data appears to have been collected in 2005, 2008, and 2009. Water quality assessments for the 305(b)/303(d) *Integrated Report* will be conducted for each basin following the last year of its monitoring period. Usually 125 waterbody subsegments are monitored each month under this program. Under the current monitoring schedule, approximately one-half of the state's waters are newly assessed for section 305(b) and section 303(d) listing purposes for each biennial cycle, with sampling occurring statewide each year. The 4-year cycle follows an initial 5-year rotation that covered all basins in the state according to the TMDL priorities. Monitoring allows LDEQ to determine whether any improvement has occurred in water quality after the TMDLs have been implemented. When LDEQ evaluates monitoring results at the end of each year, it may add waterbodies to or remove them from the section 303(d) list of impaired waterbodies.

5. Public Participation

Federal regulations require LDEQ to notify the public and seek comments concerning the TMDLs it prepares. This TMDL was developed under contract to LDEQ, and LDEQ will hold a public review period seeking comments, information, and data from the public and any other interested party. The notice for the public review period will be published in local and state newspapers and on LDEQ's electronic notification system. The TMDL report will be available on LDEQ's TMDL Web site at www.deq.louisiana.gov/portal/default.aspx?tabid=1563. The public review period will last for 30 days. LDEQ will review all comments received, and this TMDL might be revised to reflect comments if appropriate.

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Appendix A. Fecal Coliform Bacteria Monitoring Data

Table A-1. Fecal coliform bacteria data

Site	Site number	Collection date[a]	Result (MPN/100 mL)	Designated use exceeded
Intracoastal Waterway west of Boones Corner, Louisiana	851	1/19/99	13	
Intracoastal Waterway west of Boones Corner, Louisiana	851	2/17/99	2,400	SCR
Intracoastal Waterway west of Boones Corner, Louisiana	851	3/16/99	80	
Intracoastal Waterway west of Boones Corner, Louisiana	851	4/20/99	110	
Intracoastal Waterway west of Boones Corner, Louisiana	851	5/18/99	30	
Intracoastal Waterway west of Boones Corner, Louisiana	851	6/15/99	110	
Intracoastal Waterway west of Boones Corner, Louisiana	851	7/20/99	50	
Intracoastal Waterway west of Boones Corner, Louisiana	851	8/17/99	240	
Intracoastal Waterway west of Boones Corner, Louisiana	851	9/21/99	80	
Intracoastal Waterway west of Boones Corner, Louisiana	851	10/19/99	27	
Intracoastal Waterway west of Boones Corner, Louisiana	851	11/16/99	170	
Intracoastal Waterway west of Boones Corner, Louisiana	851	12/21/99	240	
Intracoastal Waterway west of Boones Corner, Louisiana	851	1/24/05	230	
Intracoastal Waterway west of Boones Corner, Louisiana	851	2/1/05	2,400	SCR
Intracoastal Waterway west of Boones Corner, Louisiana	851	3/7/05	500	
Intracoastal Waterway west of Boones Corner, Louisiana	851	3/28/05	80	
Intracoastal Waterway west of Boones Corner, Louisiana	851	4/11/05	110	
Intracoastal Waterway west of Boones Corner, Louisiana	851	5/2/05	500	PCR
Intracoastal Waterway west of Boones Corner, Louisiana	851	5/24/05	130	
Intracoastal Waterway west of Boones Corner, Louisiana	851	6/13/05	13	
Intracoastal Waterway west of Boones Corner, Louisiana	851	7/12/05	220	
Intracoastal Waterway west of Boones Corner, Louisiana	851	8/1/05	60	
Intracoastal Waterway west of Boones Corner, Louisiana	851	8/22/05	500	PCR
Intracoastal Waterway west of Boones Corner, Louisiana	851	9/19/05	17	
Intracoastal Waterway west of Boones Corner, Louisiana	851	9/19/05	17	
Intracoastal Waterway west of Boones Corner, Louisiana	851	10/22/08	13	
Intracoastal Waterway west of Boones Corner, Louisiana	851	11/12/08	1,700	
Intracoastal Waterway west of Boones Corner, Louisiana	851	12/2/08	30	
Intracoastal Waterway west of Boones Corner, Louisiana	851	1/13/09	3,000	SCR
Intracoastal Waterway west of Boones Corner, Louisiana	851	2/18/09	23	
Intracoastal Waterway west of Boones Corner, Louisiana	851	3/11/09	80	
Intracoastal Waterway west of Boones Corner, Louisiana	851	4/13/09	13	
Intracoastal Waterway west of Boones Corner, Louisiana	851	5/6/09	17	
Intracoastal Waterway west of Boones Corner, Louisiana	851	6/10/09	4	
Intracoastal Waterway west of Boones Corner, Louisiana	851	7/14/09	80	
Intracoastal Waterway west of Boones Corner, Louisiana	851	8/11/09	13	
Intracoastal Waterway west of Boones Corner, Louisiana	851	9/15/09	240	

[a] Data from before 2005 were not included in TMDL analysis.

Table A-2. Fecal coliform summary statistics for station 851

Statistic	Value[a]
Minimum (MPN/100 mL)	4
Maximum (MPN/100 mL)	3,000
Average (MPN/100 mL)	399.6
Count	25
Percentage of data that violate the PCR criterion	8
Percentage of data that violate the SCR criterion	8

[a] Data from before 2005 were not included in TMDL analysis.